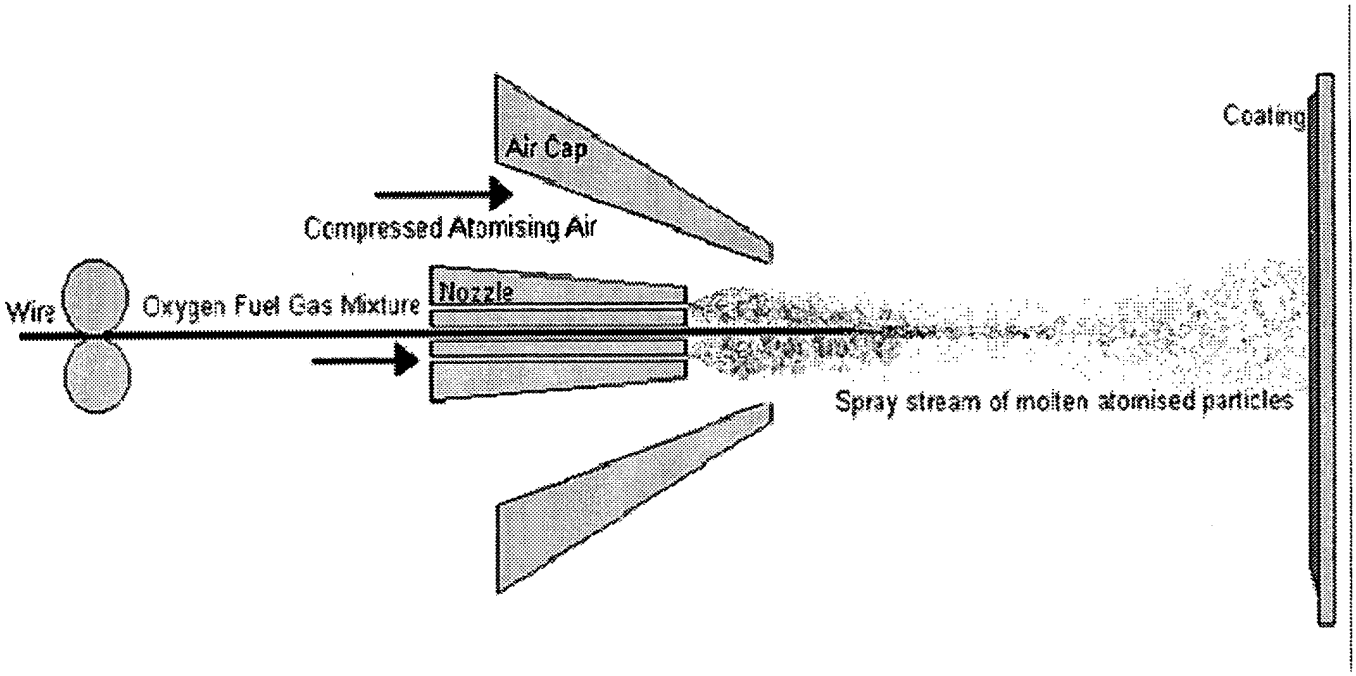
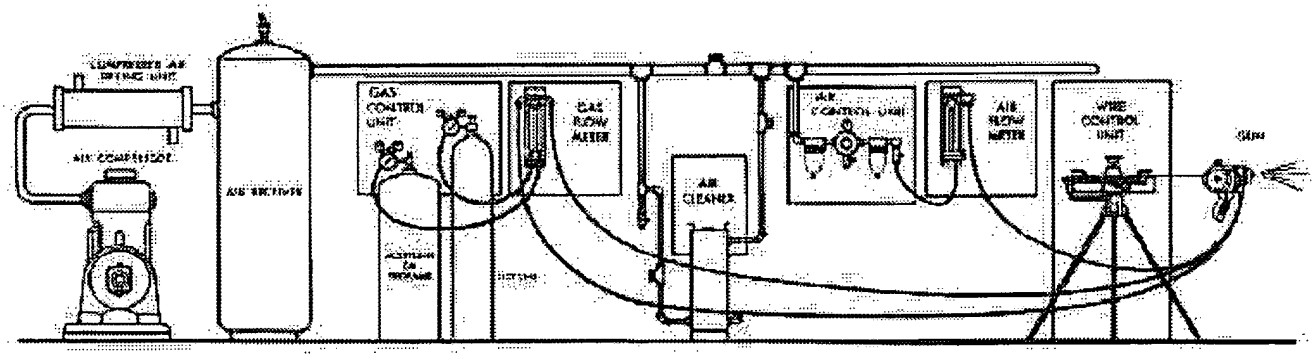
Combustion Wire Thermal Spray Process



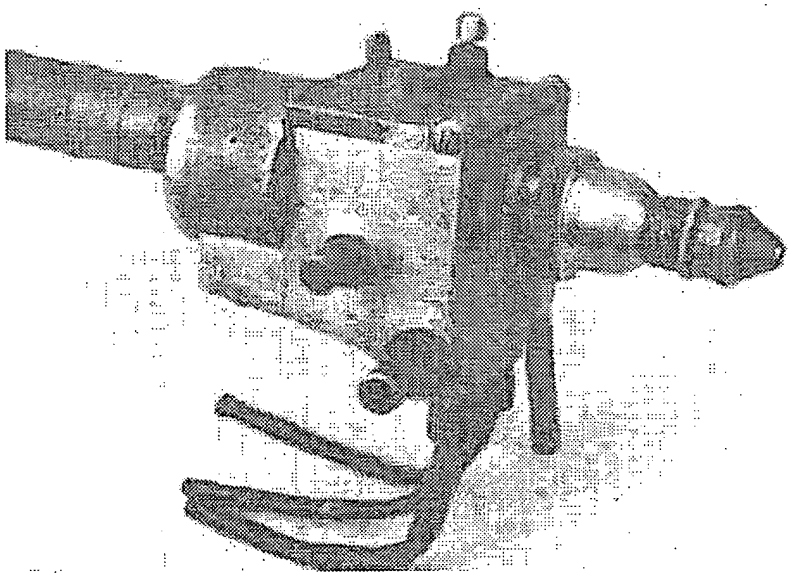
Schematic Diagram of The Combustion Wire Thermal Spray Process

(also known previously as Flame Spray, Metallizing, and Metal Spray Processes)

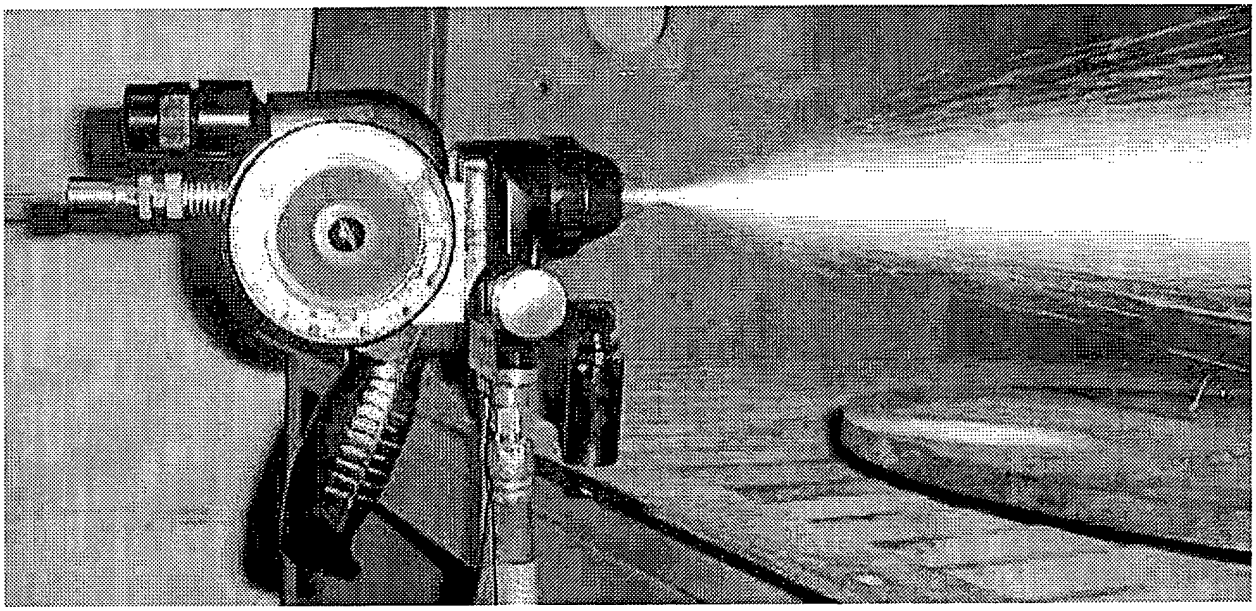


A Complete Combustion Wire Thermal Spray (Flame Spray) Process Installation

The **Combustion Wire Thermal Spray Process** formerly known as **Metallizing, Flame Spray and Metal Spray Processes** was first invented in 1910 by Schoop in Switzerland



Old Type Schoop Gun

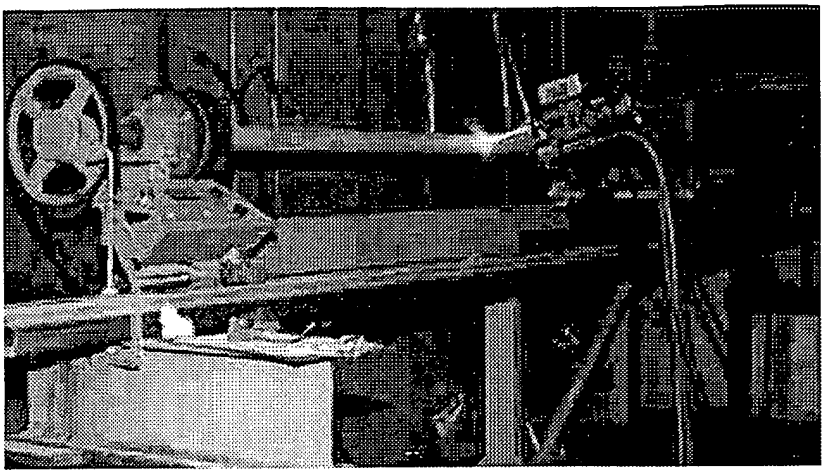


Recent Gun Spraying 13% Chromium Steel

The flame spray process is basically the spraying of molten metal* onto a surface to provide a coating. Material in wire form is melted in a flame (oxy-acetylene flame most common) and atomised using compressed air to form a fine spray. When the spray contacts the prepared surface of a substrate material, the fine molten droplets rapidly solidify forming a coating. This flame spray process carried out correctly is called a "cold process" (relative to the substrate material being coated) as the substrate temperature can be kept low during processing avoiding damage, metallurgical changes and distortion to the substrate material.

This flame spray process has been extensively used in the past and today for machine element work and anti-corrosion coatings.

* Ceramics and cermets can be used in rod or composite wire form.



Common materials Sprayed:

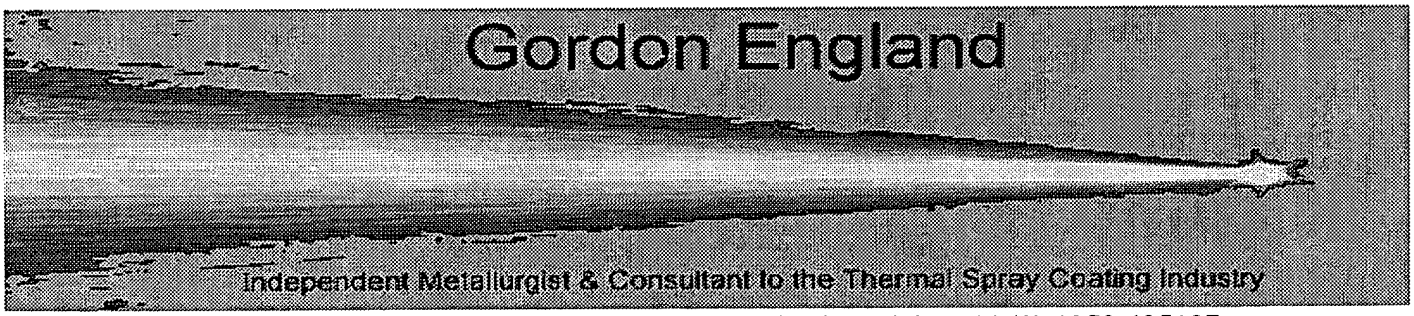
- Zinc and aluminium for anti-corrosion cathodic coatings on steel
- Nickel/aluminium composite wire for bond coats and self-bonding coatings
- Molybdenum for bond coats
- Molybdenum for hard bearing applications, excellent resistance to adhesive wear, used on piston rings, syncromesh cones and journals.
- High Chromium steel for many applications requiring hard and wear resistant coating
- Bronzes, babbitt for bearing applications
- Stainless steels, nickel and monel for anti-corrosion and wear
- Aluminium, nickel/aluminium for heat and oxidation resistance

Process Advantages:

- Low capital investment
- Simple to operate
- Wire form cheaper than powder
- Deposit efficiency very high
- Possibly still best for applying pure molybdenum coatings for wear resistance.
- Portable system
- Preheating facility built in, unlike arc spraying
- Possible to use system in areas without electricity supply

Process Disadvantages:

- Limited to spraying materials supplied in wire or rod form
- Not capable of the low oxide, high density and high strength coatings of plasma and HVOF



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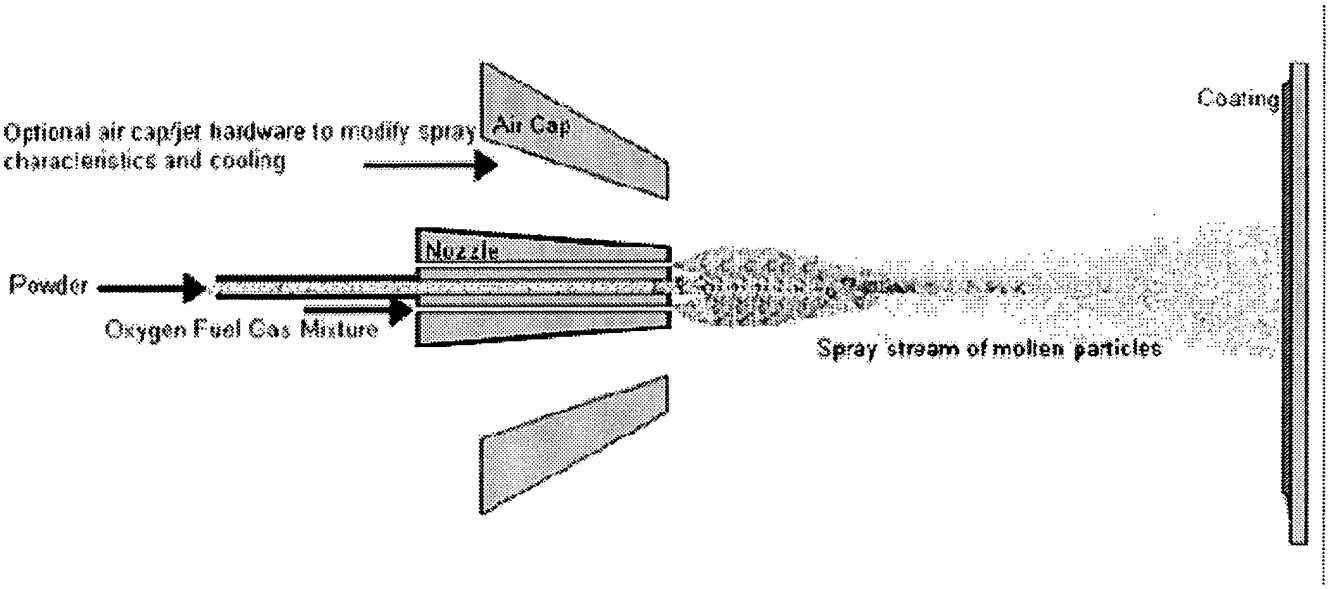
Combustion Powder Thermal Spray Process

Flame Spray Process

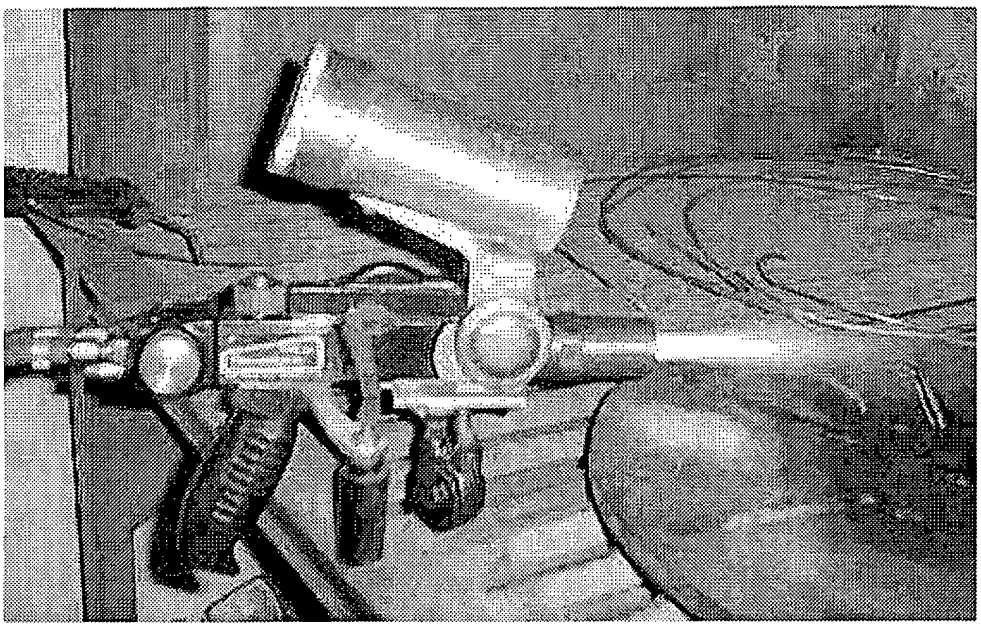


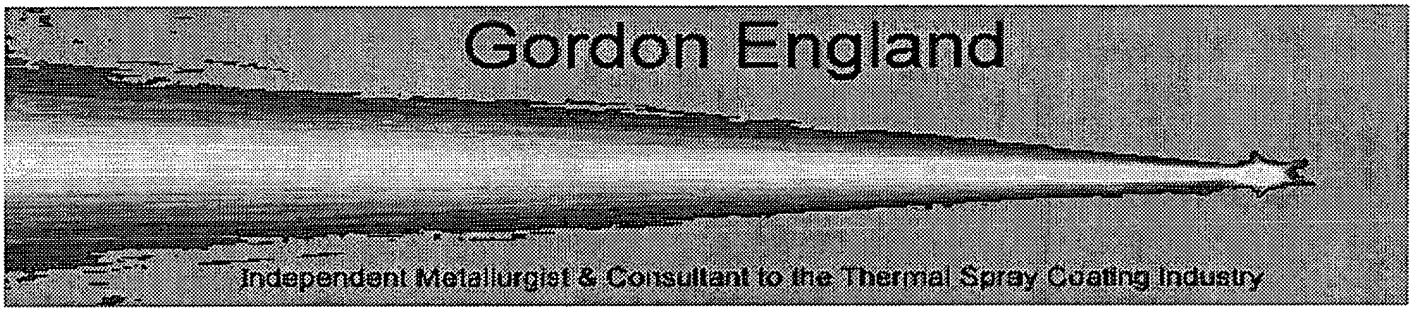
Schematic Diagram of Combustion Powder Thermal Spray Process

(also known as Powder Flame Spraying and LVOF (Low Velocity Oxygen Fuel Process)

This process is basically the spraying of molten material onto a surface to provide a coating. Material in powder form is melted in a flame (oxy-acetylene or hydrogen most common) to form a fine spray. When the spray contacts the prepared surface of a substrate material, the fine molten droplets rapidly solidify forming a coating. This flame spray process carried out correctly is called a "cold process" (relative to the substrate material being coated) as the substrate temperature can be kept low during processing avoiding damage, metallurgical changes and distortion to the substrate material.

The main advantage of this flame spray process over the similar Combustion wire spray process is that a much wider range of materials can be easily processed into powder form giving a larger choice of coatings. The flame spray process is only limited by materials with higher melting temperatures than the flame can provide or if the material decomposes on heating.





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Alternative Site Recommended for Users of Microsoft Internet Explorer
Homepage
Introducing
Nature of Thermal Spray Coatings
Thermal Spray Gun Repair Service* * *Plasma Consumable Parts* * *Thermal Spray Powder Supplies

Applications: *Thermal Spray Coatings on Carbon and Glass Fibre Reinforced Polymers* * *HVOF Coating of Paper Making Roll* * *Abradable Coatings* *

Photomicrographs: *Plasma Sprayed Coatings* * *Plasma Sprayed Chromium Oxide Coatings* * *Chromium Oxide Coatings* *Combustion Sprayed Coatings* * *HVOF WC/Co Coatings* * *HVOF WC/CoCr Coatings* * *HVOF WC/CrNi* * *HVOF NiCrMo (625) Coatings* * *HVOF NiCrMoWFe (HastelloyC) Coatings* * *HVOF Chromium Carbide Coatings* * *Plasma WC/Co* * *WC/NiCrBSi* * *Rouge Gallery* * *Rouge Gallery 2* * *Composite Substrates* * *Composite 2 Substrates* * *Effect of Preparation Technique* * *Effect of Process and Powder Size 1* * *Effect of Process and Powder Size 2* * *Abradable Coatings* * *Combustion Wire Sprayed Coatings* * *Arc Sprayed Coatings* * *Arc Sprayed Coatings 2* * *Ceramic Coatings* *

Thermal Spray Processes: *Combustion Wire Thermal Spray Process* * *Combustion Powder Thermal Spray Process* * *Arc Wire Thermal Spray Process* * *Plasma Thermal Spray Process* * *HVOF Thermal Spray Process* *

Detonation Thermal Spray Process * *Plasma Flame Theory* *

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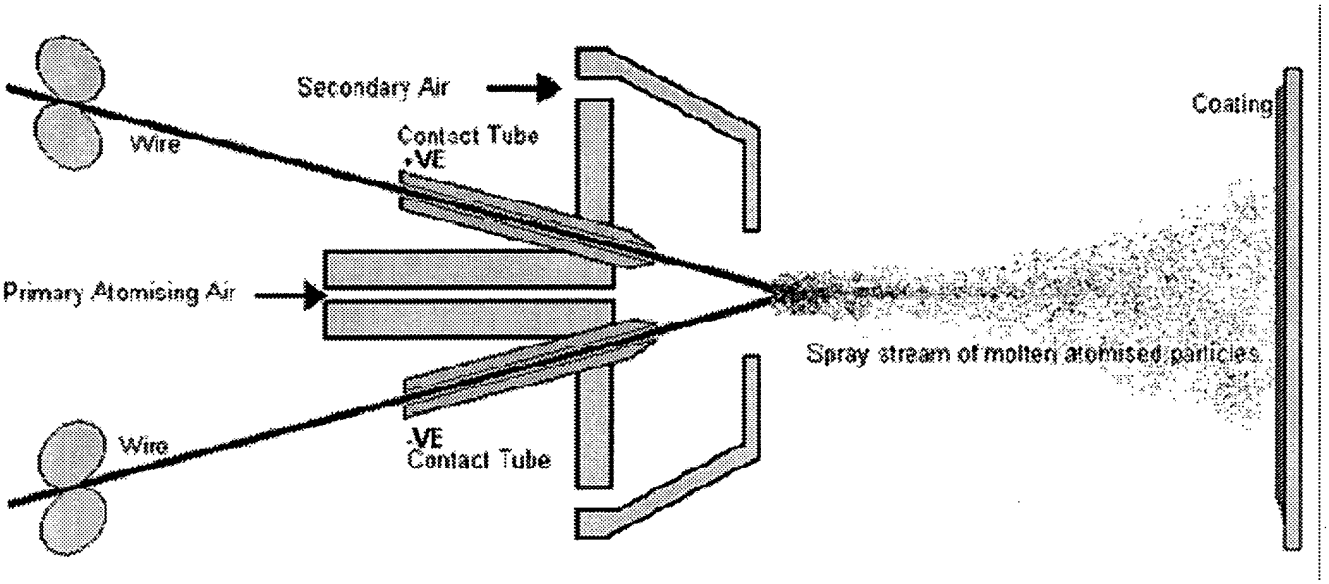
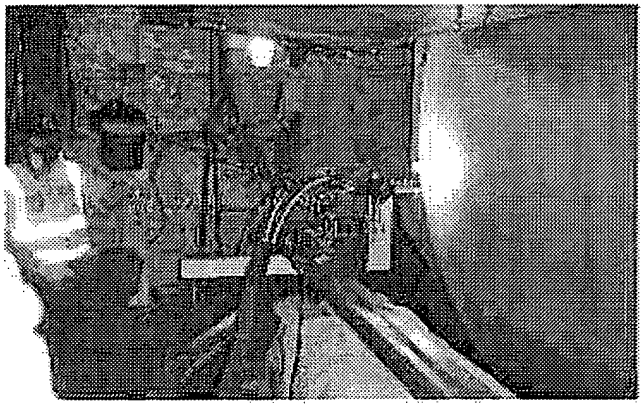
Arc Spray Process



Schematic Diagram of the Electric Arc Wire Thermal Spray Process

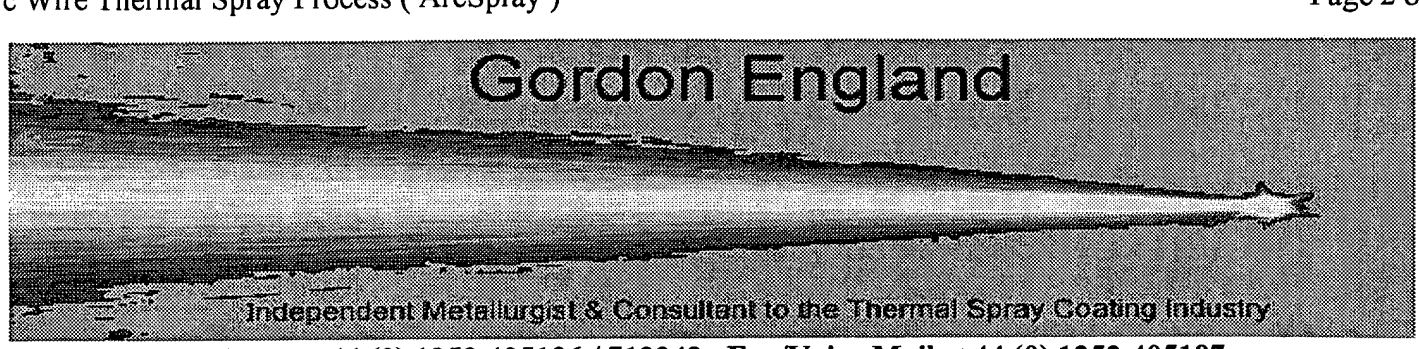
In the Arc Spray Process a pair of electrically conductive wires are melted by means of an electric arc. The molten material is atomised by compressed air and propelled towards the substrate surface. The impacting molten particles on the substrate rapidly solidify to form a coating. This arc spray process carried out correctly is called a "cold process" (relative to the substrate material being coated) as the substrate temperature can be kept low during processing avoiding damage, metallurgical changes and distortion to the substrate material.



Electric arc spray coatings are normally denser and stronger than their equivalent combustion spray coatings. Low running costs, high spray rates and efficiency make it a good tool for spraying large areas and high production rates.

Disadvantages of the electric arc spray process are that only electrically conductive wires can be sprayed and if substrate preheating is required, a separate heating source is needed.

The main applications of the arc spray process are anti-corrosion coatings of zinc and aluminium and machine element work on large components.



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